

THE ARBUCKLE-HERSHEY CHAMISAL (*ADENOSTOMA FASCICULATUM*):
A SIGNIFICANT ANOMALY IN CALIFORNIA PLANT GEOGRAPHY

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ABSTRACT

In a 1922 monograph on the California chaparral, William S. Cooper called attention to some patches of chamise (*Adenostoma fasciculatum*) growing robustly on deep alluvial soils on the west side of the lower Sacramento Valley. He submitted that these patches were relicts of “the true regional climax,” suggesting that centuries of Indian burning accounted for the prevalence of grass instead of brush when the Sacramento Valley was first seen by Europeans. We examined available historical evidence and found that Cooper was right in concluding that the chamise patches he saw were vestiges of a much more extensive (ca. 4000 ha) aboriginal stand. Whether the controlling local influence was edaphic or anthropogenic, and whether the local pattern had any wider regional implications, are questions that remain open to speculation.

Key Words: California chaparral, California valley grassland, Sacramento Valley, relict evidence, historical vegetation mapping.

More than 80 years ago, in a seminal monograph on the California chaparral, ecologist William S. Cooper (1922) called attention to what he deemed “a very interesting and significant bit of relict evidence.” He had found some well-developed patches of *Adenostoma fasciculatum* Hook. & Arn. (Rosaceae) on deep alluvial soils on the west side of the lower Sacramento Valley, between the towns of Arbuckle and Hershey. He thought the fact that *A. fasciculatum* and associated brush species could grow to full size and form a solid cover “under typical valley conditions” indicated that these patches were “almost certainly relicts of former dominance rather than centers of recent colonization,” and likely represented “the true regional climax.” He supposed that longtime burning by Indians accounted for the general prevalence of grass, not brush, when the Sacramento Valley was first seen by Europeans. This suggestion ran counter to the ascendant view of Frederic Clements (1920), who posited that grassland (especially *Nassella* spp.) represented the true climax vegetation of the Sacramento Valley.

Cooper’s interesting hypothesis still garners mention in the plant ecology literature of the region (Hamilton 1997; Keeley 2000). It has been cited approvingly by those who maintain that aboriginal burning was a primary factor in the evolution of the California landscape (Stewart 2002). However, neither supporters nor scoffers

have investigated the historical background of the presumed relicts Cooper saw ca. 1920. Utilizing mile-by-mile descriptions of land cover by a U.S. General Land Office surveyor in 1853, we have pieced together a map of the Arbuckle-Hershey locale’s vegetation as it existed prior to modern agricultural conversion.

The government surveyor, James R. McDonald, encountered a landscape as yet only lightly disturbed by agricultural settlers—only five 64-ha preemptions were established in nine survey townships (83,000 ha) when he was here in September–October 1853 (U.S. General Land Office 1853). McDonald found no settlers at all in township 13N-2W (9200 ha), the heart of which was dominated by brush he called “greasewood,” which he described as “almost impenetrable.” This “dense thicket” was evidently well known to local people as late as 1872 (Rogers 1891). Specimens of *A. fasciculatum* from here were vouchered by Alice King in 1906 and Harvey Hall in 1919 (UC/JEPS 2005)—it was at Hall’s urging that Cooper’s attention was directed to this locale. However, by the time the land was subdivided for orchard and vineyard planting ca. 1911, nearly all the brush had been cleared and the land for many years devoted to wheat and sheep (Superior California Fruit Land Company [1911?]). Nothing was said about it in soil surveys of the area conducted in 1909 and 1942–1945 (Mann et al. 1911; Harradine 1948). Today, land use in this area is characterized by a near-monoculture of irrigated almond orchards, and a visitor must search hard to find even a single specimen of *A. fasciculatum*.

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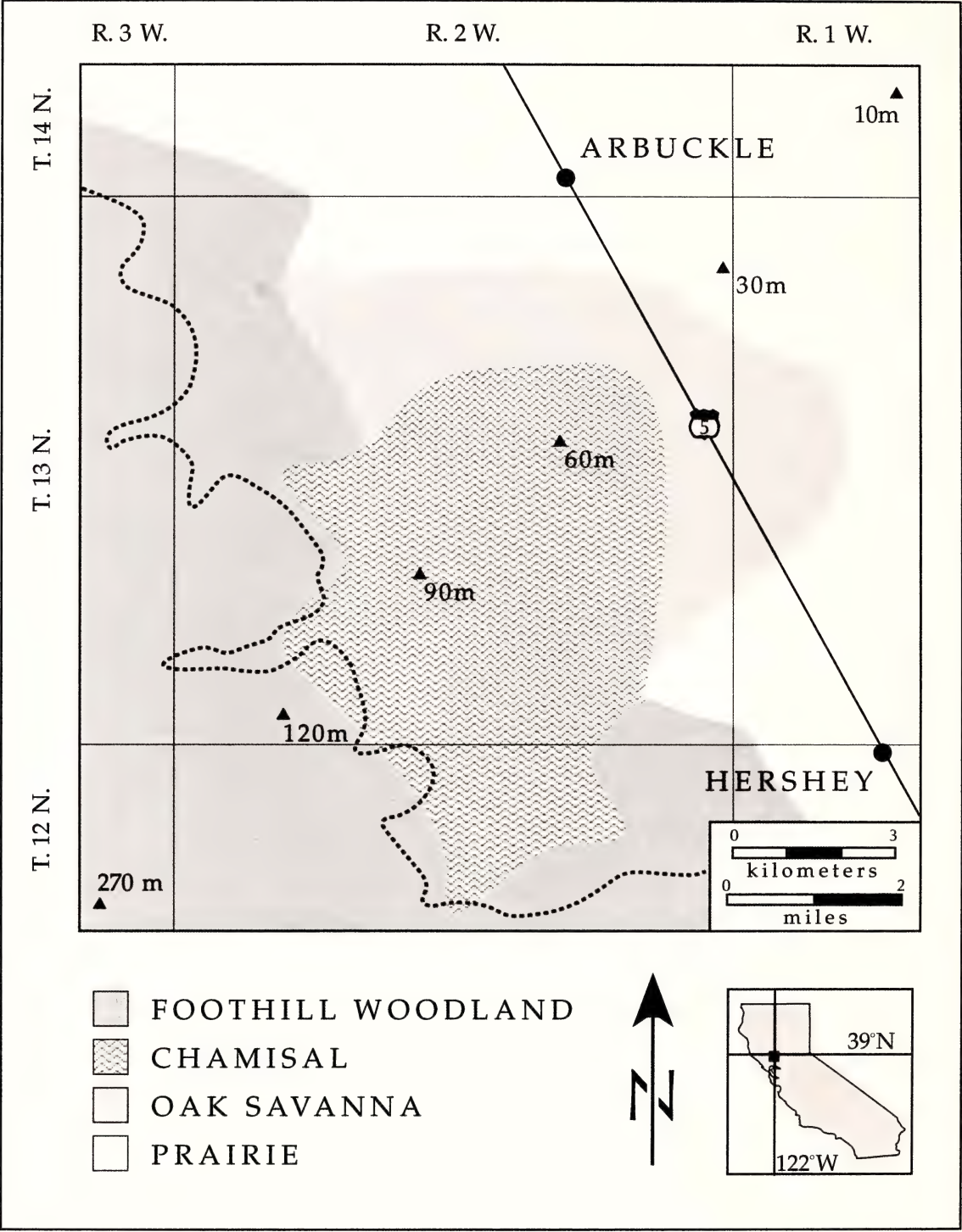


FIG. 1. Presettlement vegetation cover of the Arbuckle-Hershey vicinity, Colusa and Yolo counties, California. Centered on U.S. public land survey township 13N 2W, Mt. Diablo base line (U. S. General Land Office 1853). Dashed line indicates upper edge of Sacramento Valley alluvium (Wagner and Bortugno 1982). Virtually everything east of this line is cleared and farmed at present. "Foothill woodland" = *Quercus douglasii* + *Pinus sabiniana*; "Chamisal" = *Adenostoma fasciculatum*; "Oak savanna" = *Q. douglasii*; "Prairie" = "bunch grass" (*Nasella* spp.?) + *Avena* spp.

Our reconstruction from McDonald's 1853 survey field notes (Fig. 1) reveals a compact stand of chamise (*A. fasciculatum*) covering some 4000 ha. Above it, to the west and southwest, was typical California foothill woodland: *Quercus douglasii* Hook. & Arn. (Fagaceae) and *Pinus sabiniana* Douglas (Pinaceae) with an understory of *A. fasciculatum* and various broad-leaved chaparral species. Around the lower, easterly margin of the chamisal was a halo of *Q. douglasii* savanna. Below that was "prairie," described by McDonald as "bunch grass" (*Nassella* spp.?) and "wild oats" (*Avena* spp.). McDonald observed that the prairie was being invaded by "weeds," species not indicated.

An edaphic influence suggests itself when we compare the 1853 vegetation pattern with maps of local geology and soils, yet questions remain. Foothill woodland was clearly associated with late Pliocene and early Pleistocene structures of the Tehama and Red Bluff formations, and their peripheries. The chamisal and *Q. douglasii* savanna were associated with late Pleistocene alluvium of the Modesto-Riverbank Formation (Wagner and Bortugno 1982). They were centered on, but neither coextensive with nor limited to, soils of the Hillgate-Arbuckle-Corning association (Reed 2002). These soils (Xeralf suborder) are generally characterized by a coarse-textured upper horizon (>20 percent fine gravel and coarse sand) underlain by compact gravelly clay loam; reaction is slightly acidic (pH 5.8–6.4); relief is level to moderately sloping (0–5 percent).

Cooper was right in concluding that the *A. fasciculatum* patches he saw in the Arbuckle-Hershey locale ca. 1920 were "relicts of former dominance" over a substantially wider area. However, his deduction that such fragments indicated a "true" control by chamisal of the Sacramento Valley is still open to argument. Was the local pattern edaphic? The Hillgate-Arbuckle-Corning soil association is extensive on the west side of the Sacramento Valley, but we have found no evidence that the peculiar sequence of vegetation types described here occurred anywhere else in the region ca. 1853. Was it anthropogenic? Cooper thought the region's potential brush cover had been "pushed back" and "pinched out" by centuries of Indian burning, but the long-standing consensus among California range managers is that *A. fasciculatum* stands are persistent, even aggressive, in the face of repeated fires (Sampson 1944).

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